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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KWANG-LEONG CHOY and
ISSAC TSZ HONG CHANG

Appeal 2009-013659
Application 09/555,544
Technology Center 1700

Decided: April 22, 2010

Before EDWARD C. KIMLIN, TERRY J. OWENS, and
PETER F. KRATZ, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

The Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 29-56, which are all of the pending claims. We have jurisdiction under 35 U.S.C. § 6(b).

The Invention

The Appellants claim a method and apparatus for depositing material on a substrate. Claims 29 and 45 are illustrative:

29. A method of depositing material on a substrate, comprising the steps of:
delivering from a first outlet a stream of droplets of a precursor liquid towards a substrate;
applying an electric field between the first outlet and the substrate;
and
delivering from a second outlet a flow of fuel about the stream of droplets such as to provide an annular flame combustion region between the first outlet and the substrate through which at least a portion of the stream of droplets passes before reaching the substrate, whereby the precursor liquid is chemically reacted, or decomposed, or chemically reacted and decomposed, to provide the deposited material.

45. An apparatus for depositing material on a substrate, comprising:
a nozzle assembly including a first outlet from which a stream of droplets of a precursor liquid is in use delivered to a substrate, and a second outlet from which a flow of fuel is in use delivered such as to provide an annular flame combustion region through which at least a portion of the stream of droplets in use passes before reaching the substrate;
a precursor supply for supplying a precursor liquid to the nozzle assembly;
an electrical supply for applying an electric field between the first outlet and the substrate; and
a burner for generating the flame of the annular flame combustion region between the first outlet and the substrate;
whereby the precursor liquid is chemically reacted, or decomposed, or chemically reacted and decomposed, in the annular flame combustion region to provide the deposited material.

The References

Blackwell	6,312,656 B1	Nov. 6, 2001
Imoto (Hitachi)	JP 56-5337	Jan. 20, 1981
Masahide	JP 010-65040	Mar. 10, 1989
Choy	WO 97/21848	Jun. 19, 1997

The Rejections

The claims stand rejected as follows: claims 45-50 and 52-56 under 35 U.S.C. § 102(b) over Hitachi; claim 51 under 35 U.S.C. § 103 over Hitachi in view of Masahide; claims 29-50 and 52-56 under 35 U.S.C. § 103 over Choy in view of Blackwell; claims 29-44 and 52-56 under 35 U.S.C. § 103 over Choy in view of Hitachi; and claim 51 under 35 U.S.C. § 103 over Choy in view of Blackwell and Masahide.

OPINION

We reverse the rejections.

Issue

Have the Appellants indicated reversible error in the Examiner's determination that Hitachi or Blackwell discloses an annular flame combustion region?

Findings of Fact

Hitachi discloses a method for making an optical fiber preform comprising feeding a hydrogen containing gas through a pipe (3) such that a glass composition liquid raw material (1) is sucked up through a pipe (5) and is converted into a mist (16) and sprayed through a nozzle (11') (p. 2). An inert gas is fed through a pipe (7) which surrounds and is concentric with the nozzle (11'), and an oxidizing gas is fed through a pipe (9) which surrounds and is concentric with pipe 7 (p. 2; Fig. 1). The hydrogen and oxidizing gas ignite at the nozzle (11') outlet to produce in front of the nozzle (11') a flame (16') containing glass soot formed from the glass composition liquid raw material mist (16) (pp. 2-3).

Blackwell discloses a method for making a silica preform comprising feeding a liquid, silicon-containing compound directly into the flame of a

combustion burner, thereby forming finely divided amorphous soot (col. 1, ll. 12-15; col. 6, ll. 20-25). In the Figure 4 embodiment relied upon by the Examiner (Ans. 9-10) a burner (40) comprises a series of concentric, inwardly pointing channels surrounding an atomizer (41) (col. 9, ll. 6-8). The channel (43) adjacent to the atomizer (41) delivers an inert gas such as nitrogen, a mixture of nitrogen and oxygen, or oxygen alone to cause, by its kinetic energy, the atomization of liquid feedstock fed through the atomizer (41), thereby forming liquid projections (42) which are injected into a flame (23) (col. 9, ll. 1-3, 8-17). Surrounding channel 43 is a channel (44) through which an inert gas is fed to blanket the feedstock from oxygen in the flame and thereby inhibit reaction of the liquid feedstock and soot buildup on the face (53) of the burner (40) (col. 9, ll. 17-20). Channels (45, 46) surrounding channel 44 deliver oxygen, and a channel (47) surrounding channel 46 delivers a premix of oxygen and fuel such as methane (col. 9, ll. 23-25). The area proximate the burner face (53) and flame (23) acts as a conversion site for converting liquid projections (42) into soot reactant particles (col. 9, ll. 13-16).

Analysis

The Examiner argues that the combination of Hitachi's nozzle (11') and the ends 7' and 9' of Hitachi's pipes 7 and 9 that surround it are a burner face (Ans. 5).

The Appellants argue that the flame is across the entire area at the ends of nozzle 11' and pipe ends 7' and 9' and, therefore, cannot be annular (Reply Br. 7-8).

The Examiner responds that because, like the Appellants' apparatus, Hitachi's apparatus has three concentric pipes, one would reasonably expect that one could obtain substantially the same flame effects based on the input parameters, for example, by feeding an inert gas through the central pipe (11) and combustion gases through either or both of the other two pipes (7 and 9) (Ans. 5, 15).

The Examiner is relying upon the ability of Hitachi's nozzle 11' and pipe ends 7' and 9' to form an annular flame as being an inherent characteristic of Hitachi's apparatus. An inherent characteristic must be inevitable, and not merely a possibility or probability. *See In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981). The Appellants disclose that the annular combustion region is controlled by controlling the fuel flow rate, the distance between the nozzle assembly and the substrate, the amount and flow rate of cold gases, and the applied electric field (Spec. 3: 11-13). The Examiner has not established that Hitachi's apparatus inevitably is capable of being operated using values of parameters such as those parameters which enable an annular flame combustion region to be produced.

The Examiner argues that because Hitachi flows inert gas between the fuel stream and the oxygen stream, the fuel and oxygen are not in contact until after they have had time to mix/diffuse through the inert gas (Ans. 16). Thus, the Examiner argues, it is impossible for a flame to exist across Hitachi's entire burner face because there is no oxygen in the center to support combustion. *See id.*

Hitachi discloses that the mist liquid (16) is “ignited at the nozzle [11’] outlet to produce a flame containing glass soot” (p. 2). The Examiner appears to be arguing that there is a region between Hitachi’s nozzle 11’ and the flame where, due to lack of oxygen, there is no combustion. That argument is not persuasive because it is mere speculation. Regardless, even if that argument is correct it is not convincing because the Examiner has not established that such a region would be an annular flame combustion region as that term is most broadly construed consistent with the Appellants’ Specification. *See In re Translogic Tech. Inc.*, 504 F.3d 1249, 1256 (Fed. Cir. 2007) (“[D]uring examination proceedings, claims are given their broadest reasonable interpretation consistent with the specification”, quoting *In re Hyatt*, 211 F.3d 1367, 1372 (Fed. Cir. 2000)).

Regarding Blackwell the Appellants argue that the inwardly-directed frustoconical fuel channel (47) can only provide a single, continuous flame combustion region (23), and that Blackwell’s disclosures that the atomized liquid is injected into the flame (23) and that the area proximate the burner face (53) and the flame (23) acts as a conversion site for converting the liquid projections (42) into soot reactant particles indicate that the flame combustion region (23) extends over the atomizer (41) (Br. 14-15).

The Examiner argues that because Blackwell’s fuel is introduced only through the outermost concentric channel, the combustion zone necessarily is annular (Ans. 10).

As pointed out above, an inherent characteristic must be inevitable. The Examiner has not established that it is inevitable that Blackwell’s

apparatus can be operated such that the combustion zone is annular rather than extending across the burner as shown in Figure 4 due to a cause such as mixing among the flows from Blackwell's channels.

The Examiner argues that the space proximate Blackwell's burner face at which inert gas is used to prevent burner buildup (col. 9, ll. 37-40) can be considered to correspond to the Appellants' annular flame combustion region (Ans. 19-20).

That argument is not well taken because the Examiner has not established that such an interpretation of "annular flame combustion region" is within the broadest reasonable interpretation of that term consistent with the Appellants' Specification. *See In re Translogic Tech. Inc.*, 504 F.3d at 1256.

The Examiner argues that an annular flame combustion region can be formed using Blackwell's apparatus by having sufficient inert gas flow in a central region to prevent combustion (Ans. 20).

That argument is not persuasive because it is mere speculation. As stated above, an inherent characteristic must be inevitable, and the Examiner has not established that Blackwell's apparatus when operated as proposed by the Examiner inevitably is capable of forming an annular flame combustion region.

Conclusion of Law

The Appellants have indicated reversible error in the Examiner's determination that Hitachi or Blackwell discloses an annular flame combustion region.

DECISION/ORDER

The rejections of claims 45-50 and 52-56 under 35 U.S.C. § 102(b) over Hitachi, claim 51 under 35 U.S.C. § 103 over Hitachi in view of Masahide, claims 29-50 and 52-56 under 35 U.S.C. § 103 over Choy in view of Blackwell, claims 29-44 and 52-56 under 35 U.S.C. § 103 over Choy in view of Hitachi, and claim 51 under 35 U.S.C. § 103 over Choy in view of Blackwell and Masahide are reversed.

It is ordered that the Examiner's decision is reversed.

REVERSED

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